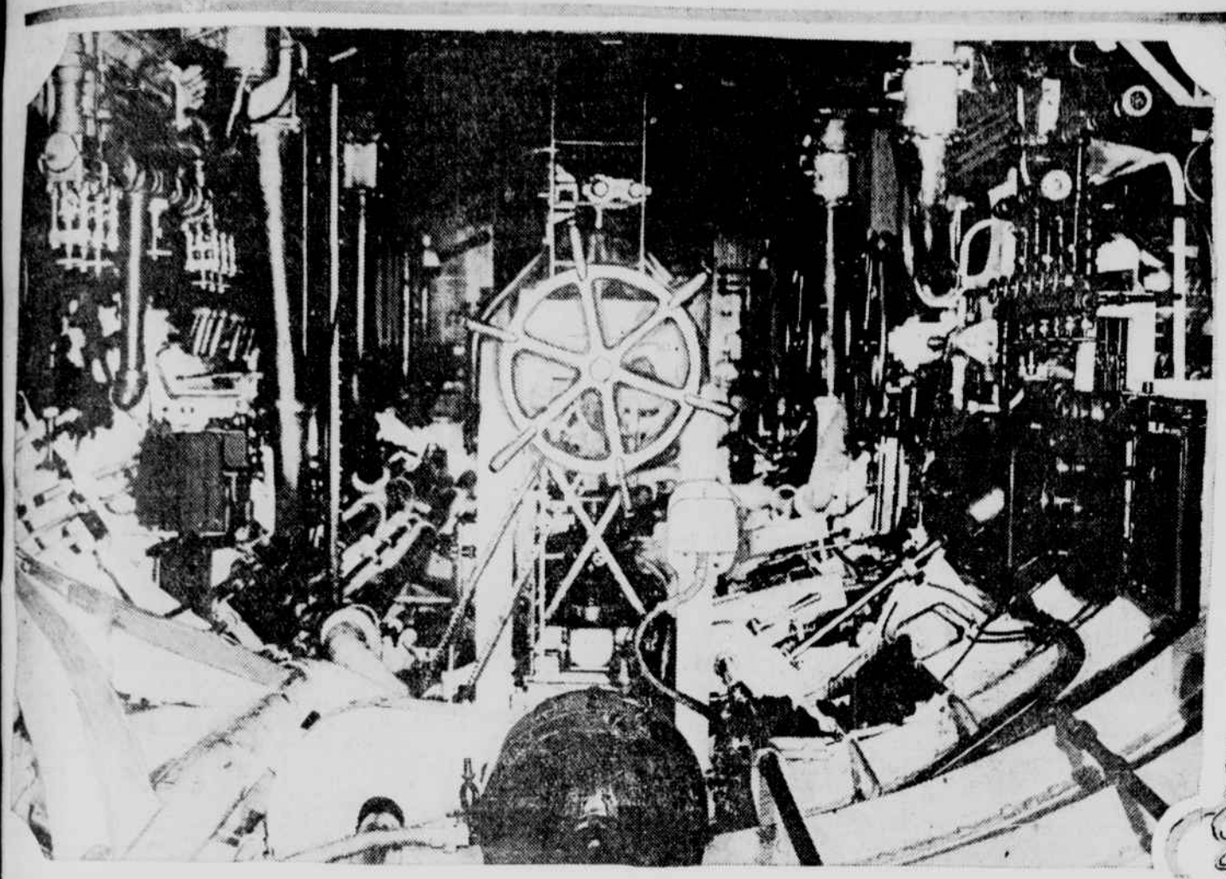
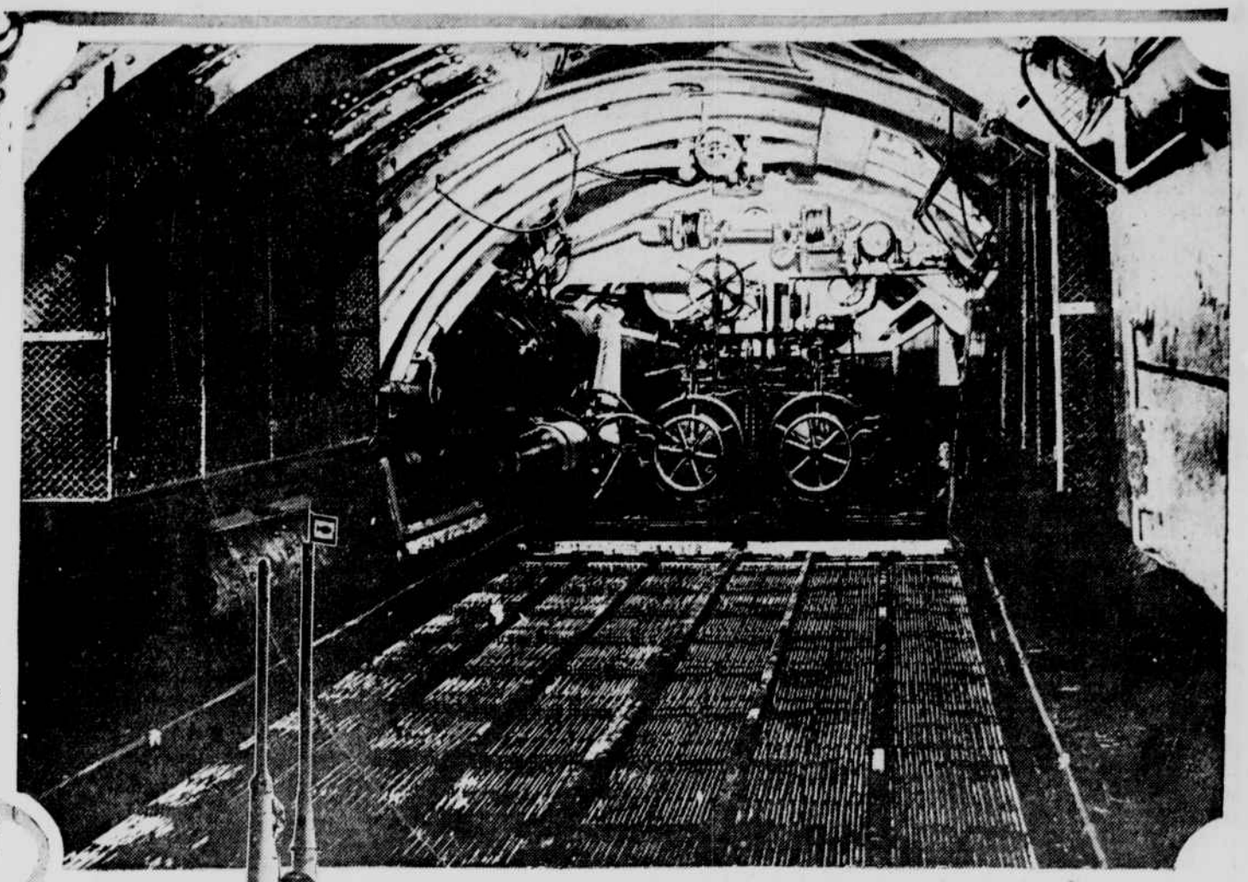
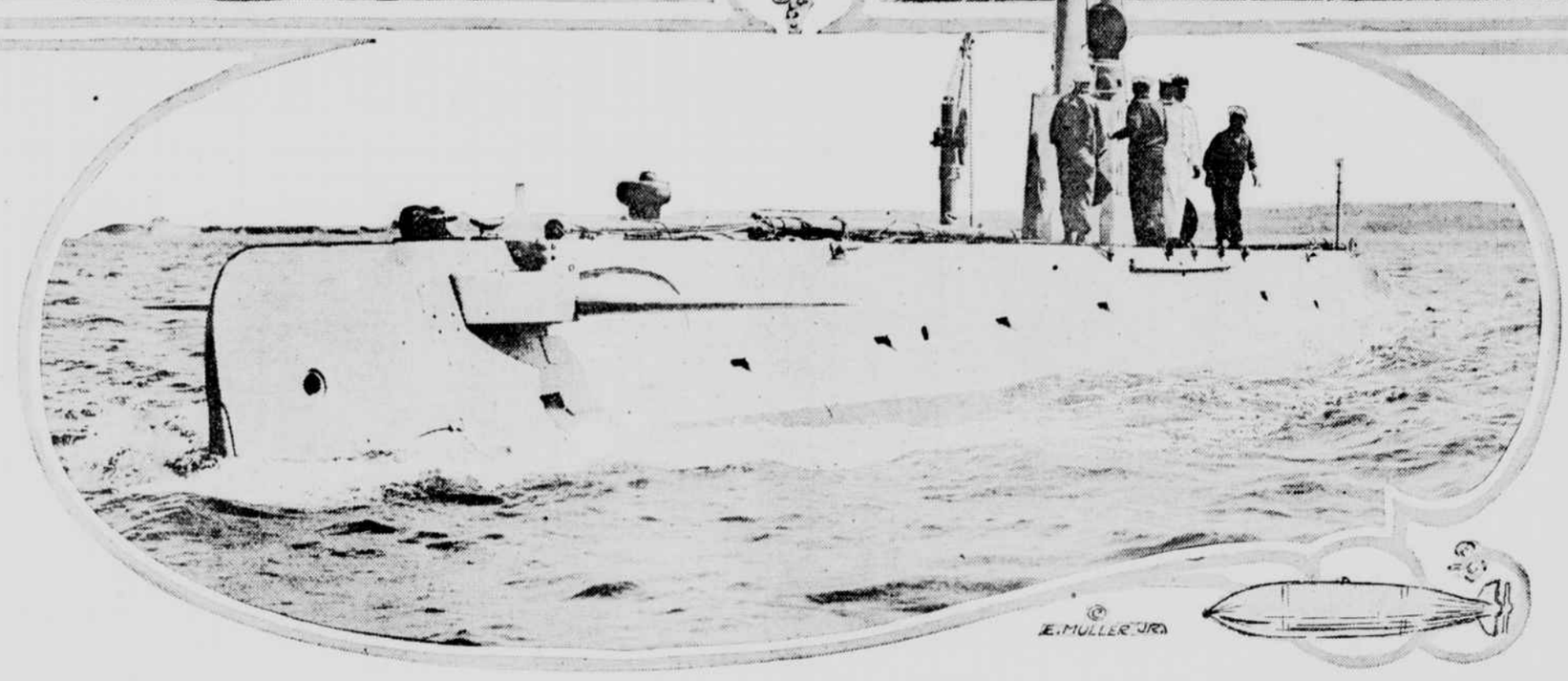
SINKING WITH A SUBMARINE INTO HOSTILE DEPTHS



Interior of a Submarine, Showing Maze of Machinery in Which the Pilot Works.



Another Interior View, Showing the Exposed Batteries.



E-2, One of the Latest Types of Submarine.

Water, Not Warships, Chief Foe of Crew of Steel 'Bubble.'

By WILLIAM MORRIS HOUGHTON.

WATER is the submarine's worst enemy. This does not except battleships, destroyers, submarine mines, aeroplanes or any other of the instruments of destruction by which man has with indifferent success to protect himself from his own invention. In substantiation of which we have the word of Lieutenant Commander Claus Hansen, Germany's most decorated submarine fighter, and the fate of the F-4 off Honolulu—an imposing and up-to-the-minute combination.

"There is always danger from a leak," is Lieutenant Commander Hansen's laconic explanation. And navy men are practically unanimous in the opinion that it was a leak which prevented the F-4 from rising, not because it disabled the boat, but because it disabled the crew. When one considers that of all human contrivances the submarine has most to do with water, and that with all other kinds of boats it is the boat and not the crew which a leak first puts out of business, the whole thing sounds hopelessly paradoxical and complicated. But an elementary lesson in the anatomy and operation of the mechanical whale will elucidate the mystery.

To begin with, the thing has a double bottom when floating on the surface and only a single one when submerged, which, of course, simply confuses us the more until we learn that between the two bottoms is a series of tanks. The sea is let into these tanks when it is desired to submerge the craft, and, filled or partially so, they drag it under, just as water let into the hold of any ship will sink her. But the submarine, having a steel roof as strong and as watertight as her hull, can regulate her sinking by the amount of water she is willing to take into her tanks.

AT A HUNDRED YARDS DEPTH THE PRESSURE IS DANGEROUS.

With her tanks full, however, she has only a single skin to keep her dry, which increases her vulnerability. And the deeper she dives the greater becomes the pressure on her plates, increasing at the rate of 44-100 of a pound per square inch every foot she sinks. This means that at the estimated depth of 320 feet, where the F-4 rests, the pressure on her plates is 140 pounds per square inch, enough to start her leaking were she without defect.

Just above the tanks full of salt water rest the submarine's batteries for her propulsion when submerged. The electrolyte used in these batteries is sulphuric acid, which, when combined with salt water, produces the deadly chlorine gas. In case of a leak this gas spreads throughout the boat, but especially into the living quarters of the crew and into the central control compartment just above the batteries, and asphyxiates the crew before they can bring the boat to the surface. Otherwise, by simply blowing the water out of her tanks and turning her diving rudder upward, they could by shooting to the top and making for home escape any serious consequences from a small leak. Even should they hit bottom, causing it difficult if not impossible to eject the water and impossible to continue the navigation of the boat, the crew might remain alive for two or three days on their supply of compressed air were it not for this gas which attacks the membranes of the nose and lungs and destroys its victim in short order.

A DOCUMENT FROM THE TOMB OF THE HEROIC DEAD.

Of course, rapid asphyxiation is preferable to slow suffocation from lack of air if death from one or the other is inevitable. The presence of this sulphuric acid in the batteries has therefore undoubtedly proved a blessing on certain tragic occasions, as in the case of the Japanese submarine No. 6, which sank while maneuvring with a squadron off Kure in the forenoon of April 13, 1910. Commander Sakuma wrote a letter while he and all his men were awaiting inevitable death, a letter which was obtained by the wreckers when the boat was raised, too late to save her crew. This is a part of what he wrote:

"We were making a dive when the submarine sank lower than was intended. We tried to close the sluice valve, when the chain unfortunately broke. I therefore closed the valve with my hands, but it was too late to avoid disaster, and the sea entered the rear of the boat, which sank with a list of 25 degrees. We have worked hard to pump out the water, but the boat remains in the same position.

"A word to His Majesty. I respectfully beg to say that it is my hope that Your Majesty will see to it that the bereaved families of the crew are provided for. This is foremost in my mind.

"The air pressure is becoming so great that I feel as if my eardrums were breaking.

"It is now 12:30 p. m. My respiration has become difficult and more and more painful. I thought I would hold out against the gas, but now I am intoxicated by it. . . .

"It is now 12:40 p. m. and" . . .

There the message ended. The submarine was raised after some days and towed to Kure.

MEN ON F-4 WERE PROBABLY SPARED DEATH FROM SUFFOCATION.

Possibly some such pathetic and heroic document will be found when the F-4 is finally lifted to the surface and the bodies of Lieutenant Ede and his men are recovered. In any event it is highly probable they were spared a lingering death from suffocation by the permeation of the chlorine gas.

Navy men suppose the accident to the F-4 is a duplicate in its inception of one that happened to another boat of her class. In the latter case the sulphuric acid from one of the batteries was itself found to be leaking and causing a corrosion of the hull, which under pressure from submersion would have meant the forcing of the corroded plate and a bad intake of salt water just where it would prove most dangerous. But this leak was discovered in time and remedied, whereas the one in the F-4, it is supposed, went undetected until the dive off Honolulu harbor and the consequent puncture of the hull made discovery too late to prevent the death of the crew.

A miraculous escape from chlorine asphyxiation is told of the commander and crew of nineteeen of the Russian submarine Minoga which, in April, 1913, while manœuvring off Libau took a sudden plunge and remained at the bottom nine hours.

REMARKABLE PRESERVATION OF THE MEN ON THE MINOGA.

The accident happened at 3 o'clock of a Saturday afternoon, when most of the men at the naval station had dispersed, so that the appearance of the emergency buoy was not remarked for hours. It was not until 9 o'clock at night that the salvage vessels reached the spot. Happily the weather conditions remained favorable, and divers having fixed the lifting chains the Minoga was successfully brought to the surface by midnight.

When the after hatch was opened three men, barely able to crawl, were helped out. Fifteen more of the crew and the commander were lifted out unconscious. There remained only the coxswain, who was in the conning tower amidships. It was necessary to raise the vessel well out of the water to get at the conning tower, and this took another three hours. But the coxswain when released was found to be in a better condition than any of the rest of the crew.

In this particular boat it happened that all the batteries were grouped forward under the living quarters of the crew, none of them being under the central control compartment. When the water, let in through a defective ventilator, affected the balance of the boat and caused her to plunge to the bottom the crew fled from their living quarters into the central control compartment, sealing as best they could the passageway between the two to keep the gas from penetrating to them in any great quantity. Water continued to enter until the air within the vessel was so far compressed as to resist the entrance of any more at a depth of seven fathoms. On this air the crew survived, though suffering to some degree from the fumes of the chlorine gas, some of which reached them despite every precaution, finally rendering most of them unconscious. Only the coxswain in the conning tower seemed to have been out of reach of them, which accounted for his comparatively good condition when rescued three hours later than any of his comrades.

CREW OF THE CARP CUT CABLES AND SOARED TO THE SURFACE.

The day before the Titanic went down the American submarine Carp, or F-4, fouled its anchor chain and took a plunge almost to the bottom of San Francisco Bay. Its recovery illustrates the potential buoyancy of one of these submersible boats when there is no leak to interfere with crew or mechanism.

The exact depth reached by the Carp was 200 feet. Unmindful of their plight the eight men of the crew, in command of Ensign Simeon Smith, stood drinking wine and eating turkey sandwiches in honor of the supposedly successful and certainly deep dive. They were warned of their peril by a telephonic message from Lieutenant C. P. Huff, a member of the trial board, and in an instant they were at work cutting the anchor chain, which had become entangled in a cable dropped from a lighter. When this had been cut it was found that still another cable had fouled the craft.

Finally this entanglement was cut, and then in their zeal to rise the men blew twenty-six tons of water out of her tanks. She shot upward like a torpedo, gaining momentum with every foot until, nose first, she burst above the surface like a great gray whale and for an instant stood almost upright eighty feet in the air. Then she slowly righted herself and lay on an even keel. Champagne bottles and glasses were shattered to fragments and the men inside were tossed about like corks, but they escaped with minor bruises.

THE CONSTRUCTION AND TESTING OF A SUBMARINE CRAFT.

The form of the hull of a submarine is generally described as cigar shaped. It is built of the very best quality of mild steel, the workmanship being of the highest order, because every seam and rivet must be perfectly tight. The United States government requires the builders of its submarines to test each boat at a depth of 200 feet. For this purpose instruments are placed inside her to indicate just how she bears the pressure in every particular and she is towed out and lowered with derricks. No men go down with her.

On the surface a submarine is prepared for cruising. A considerable portion of her hull is above water, a removable navigating bridge is in place, and she is driven by large, powerful internal combustion engines. Under these conditions she is managed in about the same way as any vessel built to run on the surface and her seagoing qualities have been found to be excellent. Inside her, however, due to an entire absence of portholes it is almost impossible to tell whether she is running on the surface or beneath.

An experienced ear judges by the greater silence when under water. "Running under sea there is a deathlike silence in the boat," says Commander Hansen. "The electric machinery is noiseless. It is not unusual to hear the propeller of a ship passing over or near us."

After a short time below, too, the air in the compartments becomes noticeably stuffy and the odor of machinery oil becomes stronger.

"When the weather is bad"—it is Commander Hansen speaking again—"or we are in proximity to the enemy we remain down so long that the air becomes unusually bad. Every man except those actually on duty is ordered to lie down and remain absolutely quiet, making no unnecessary movements, as such exertions cause the lungs to use more oxygen, and oxygen must be saved. Just so the famishing man on the desert tries to make the last drop of water go the farthest. As there can be no fire, because fire burns oxygen, and the electric power from the accumulators is too precious to be wasted for cooking, we have to dine cold when cruising."

Perils and Discomforts of Daily Life in Diving Craft.

But this is not the hardship it might seem, since the bad air produces seasicknes with many and with others an overpowering drowsiness. The German commander says he has had new men who did not eat for the first three day out because they were unwilling to lose that time from sleep. No wonder, then, he explains, this submarine existence "is fearfully trying on the nerves, and every man does not stand it."

"Day after day," he goes on, "in such cramped quarters, where there is hardly room to stretch our legs, and being constantly on the alert, there is a tremendous strain on the nerves. I have sat or stood for eight hours with my eyes glued to the periscope, and I have peered into the brilliant glass until my eyes and my head ached."

THE INVISIBLE SPECTATOR BEHIND THE PERISCOPE.

A word about the periscope. This consists of a vertical tube which extends from above the surface of the water to a few feet within the submarine. At the top of the tube is an object glass, at the bottom an eye piece. Two reflecting mirrors, one at the top, the other at the bottom of the vertical tube, cause the image to be transferred from the object glass to the eye piece. The operator can turn the periscope so as to sweep the whole horizon, and he has a view as clear as if he were at the surface looking through an ordinary field glass.

"It gives one a peculiarly uncanny feeling beneath the water to see and not be seen," remarks Commander Hansen. "I have passed near ships and have seen the officers on the bridge and the people on the deck. They had not the slightest idea that there was anything like a submarine in the vicinity."

This sense of power derived from invisibility is really the only compensation which the submarine service offers for the hideous risks inherent in it.

130,000 BANDAGES FOR THE BRITISH SOLDIERS

PREPARING bandages seems in the abstract like a most prosaic job, especially if the place of their use is on the other side of a great ocean. It is not until you have seen women at work upon them and begin to realize through the sense of sight the service that is expected of them that the task becomes one of almost fascinating character. You look at the neat packet of gauze—one among hundreds lying in a great, stout packing case—pick it up, turn it over. It brings you close to the grim realities of the battlefield and the hospital.

It serves to make warfare a more concrete thing.

Even if making bandages were a more prosaic task than it is, when willing hands stirred by patriotic feeling are engaged in it, it is a piece of work that has to be done. To say that so many cases of bandages and other supplies were dispatched on yesterday's steamer does not convey a very clear impression of how valuable a single case, or two or three of such supplies really is. When one stops to count up the products of the hands of a few skilled in such work and finds that, say, 125,000 packets of gauze have been cut, folded and forwarded then one realizes how much every bit of work, however seemingly humble, counts. That means a bandage for one soldier in every ten of the British army.

Nearly every nation engaged in the European war has found friends in this country to do something for its wounded soldiers. Not only has there been organized effort in behalf of the refugees of Belgium and civilian sufferers from war's hardships in Poland, but relief organizations have been formed on every side to aid the wounded. One of these is the British War Relief Association, which is sending clothing and supplies of comforts for the care of the injured among the soldiers of the allied armies.

The association, which has established headquarters at 132 to 138 West Twenty-seventh Street, has sent more than 130,000 dressings in addition to many other articles, such as tobacco, cigarettes, socks, mufflers, magazines, etc. Altogether more than 200 cases in addition to two motor ambulances have been shipped abroad.

A large amount of volunteer work is done by persons interested in helping, and many articles are made from the materials which are purchased by the money gifts of those who cannot give their time or come to the headquarters to contribute their services. War stimulates the giving of articles which fulfil the requirement of a gift as exemplified to Sir Launfal in his vision. Such was that which came one day from a little girl. It was a knitted washrag wrapped around a cake of soap. On it was a note in the hand of a woman, probably her mother, which read:

"The first bit of knitting of a little American girl, which she wants to send to an English soldier."

Many knitted articles are contributed weekly by women in nearby cities and in Canada. Groups of women in Massachusetts, New York and other states are regular contributors of such articles. They are sent to Queen Mary's Needlework Guild, at St. James's Palace, London. A letter received recently from the Hon. Lady Lawley tells what is done with such articles.

"I hope," she says, "you will convey her majesty's thanks to the members of the British War Relief Association who have so kindly sent them. I am still sending enormous consignments of things to our soldiers and sailors at the front and to the mine sweepers and trawlers in the North Sea, where the men are suffering dreadfully from the cold."

The mine sweepers and trawlers perform heroic tasks on the gray, mist-covered waters of the chill North Sea. They are a part of England's line of defence.

Supplies also go to the Belgian Relief Committee of London. Some of the articles which have been sent have been distributed to families of once prosperous Belgians, who have suddenly, through the war, become penniless. One such family, which was supplied with clothing, had owned a sailing yacht, a steam yacht, two motor cars and ponies for the children. The family arrived in London with nothing except the clothing which it had upon its backs. The association hopes to be able to respond to the request received from the trenches for large consignments of mosquito netting. The netting is required for covering the trenches and the hospital cots as a means of preventing an epidemic of typhoid fever and keeping the flies away from the wounded when the warm weather sets in. Mosquito netting is not much of a defence against 42-centimetre shells, but it is a great fortress when set up against the more deadly germ carrier.

Major Louis Livingston Seaman, U. S. A., who has been at the front for several months, is the president of the association. Mrs. Walter Mulliner, the active director; James Chittick, the treasurer, and among the patrons are Mrs. Harry Payne Whitney, Mrs. Orme Wilson, the Rev. and Mrs. J. H. Jowett, Mrs. Bradley Martin, Bishops Courtney and Brewster, of Connecticut; Kinsman, of Delaware, and Babcock, of Boston.

AN UNJUSTIFIED REPROACH.

Golf Professional (giving a lesson)—You know, sir, you lift your elbow too much to play golf properly.

New Member—How dare you! I'll report you to the committee! I'm a lifelong teetotaler!—Tit-Bits.